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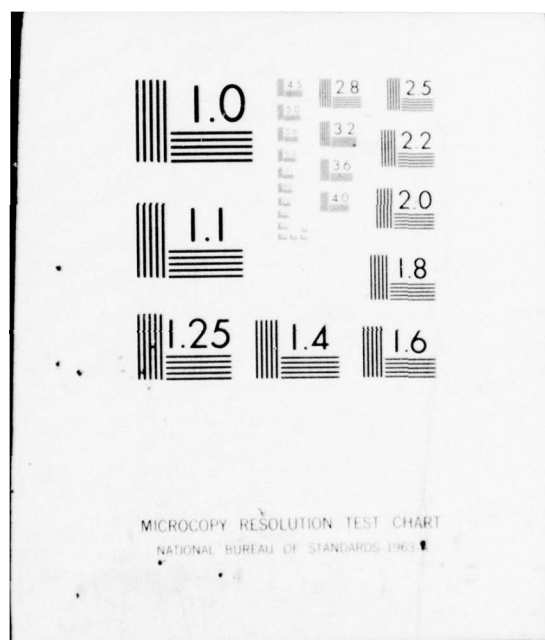
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## PROGRAM MANAGEMENT COURSE INDIVIDUAL STUDY PROGRAM

A REVIEW OF THE MANAGEMENT  
OF AIR FORCE AIR-TO-AIR  
MISSILES RESEARCH, DEVELOPMENT  
TESTING, AND PRODUCTION PROGRAMS

STUDY PROJECT REPORT  
PMC 76-1

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STUDY TITLE: A Review of the Management of Air Force Air-to-Air Missiles Research, Development Testing, and Production Programs

**STUDY PROJECT GOALS:** The goals of this study project were to review the management of Air Force Air-to-Air Missile RDT&E/Production programs to determine A) if sound management practices were being followed adequately, B) if the management structure was appropriate, and C) if the management could be improved and, if so, how.

## STUDY REPORT ABSTRACT

Although Navy has maintained lead Service in Air-to-Air Missiles (AAM) during the last decade, Air Force interest in this vital tactical weapons area has kept pace. Air Force has participated in the Navy's SPARROW and SIDEWINDER programs and remains an active partner in the conceptualization of follow-on missiles. This report reviews past and present Air Force AAM efforts with an emphasis placed upon management lessons learned. Future AAM developments in the Air Force will most likely also be joint-Service efforts and management will be an important key element in fulfilling Air Force AAM requirements. The review disclosed readily solvable management issues and provides conclusions and recommendations towards this end.

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		JOINT REQUIREMENTS	
sparrow III			

**- KEY WORDS:**

Air-to-Air Missiles  
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A REVIEW OF THE MANAGEMENT OF AIR  
FORCE AIR-TO-AIR MISSILES RESEARCH,  
DEVELOPMENT, TESTING, AND PRODUCTION  
PROGRAMS

Study Project Report  
Individual Study Program

Defense Systems Management School  
Program Management Course  
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by

Frank David Moruzzi  
Major                      USAF

March 1976

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Mr. William M. Cullen

This study project report represents the views, conclusions, and recommendations of the author and does not necessarily reflect the official opinion of the Defense Systems Management School of the Department of Defense

## EXECUTIVE SUMMARY

While the Navy has maintained lead or executive Service in air-to-air missiles (AAM) research, development, testing and production during the last decade, the Air Force interest in this vital tactical weapons area has kept pace. Air Force participation in-depth in AAM RDT&E/production at this time appears to be a function of the management emphasis this Service is willing to apply. The purpose of this project was to review Air Force management of contemporary AAM programs with a look toward the future.

There are two production or near production AAM programs for which Navy has lead and Air Force provides participation--AIM-9L SIDEWINDER and AIM-7F SPARROW. In addition, these Services are participating in two other conceptual efforts to look at the follow-on short-range dogfight missile and the medium long-range follow-on missiles. Any future AAM program will also presumably be a joint Service effort.

This report has documented and substantiated such a premise. Therefore a view of the management problem areas in Air Force AAM efforts was attempted with the idea being to improve this Service's posture. The review disclosed readily solvable problems in the areas of present and future joint Service efforts, technology efforts, T&E, and a systems acquisition approach. The external influences reviewed were limited to Congress and DOD, although international considerations were discussed briefly.

The conclusions and recommendations which are part of this report, and also appear in checklist form in Appendix E, center around three main themes. The Air Force at all levels from the Air Staff right down to the

laboratory project can improve its collective posture in managing AAM programs through adjustments in (1) Preparation, (2) Participation, and (3) Organization. If the proper preparatory steps are taken; if the right people are attracted, trained, and retained; and if organizational adjustments can be made, the Air Force will be in a much better managerial position with respect to present and future AAM efforts. The key points in making these adjustments are summarized as follows:

PREPARATION. Air Force needs to accept and prepare for joint Service programs with Navy, as follow-on to AIM-9L and AIM-7F. The Air Force laboratories should reorient to technology base maintenance and not deal in engineering development efforts. An overall improvement is needed in Air Force systems acquisition capability.

PARTICIPATION. Capable, knowledgeable and industrious people are required in the key staff positions of AFSC and HQ USAF. Program and project people need to be attracted and trained in systems acquisition. Program managers with proper systems acquisition training, backgrounds which include joint Service/multi-national programs and operational experiences are required.

ORGANIZATION. The Air Force Armament Development and Test Center should move to a Product Division. A reduction in the number of program elements which support AAM RDT&E, in conjunction with naming of single focal points at the ADTC, HQ AFSC, and HQ USAF is required. The ADTC Missile Systems Program Office should be the directed action office for all Air Force RDT&E tasks except for major AAM programs as defined by DODD 5000.1 where minimum layering applies.

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## SECTION I

### INTRODUCTION

Fifty years ago at Auburn, Massachusetts, Dr. Robert M. Goddard began the missile and space age with a successful launching of a liquid-fueled rocket. (15:C2) It wasn't long before the utility of rockets in the form of "guided bullets" was applied to another new technology--manned flight. Germany appears to have been the first with a missile designed to be launched from a fighter aircraft. It was also liquid propelled, stabilized with four symmetrically placed fins, and guided by signals transmitted through a pair of fine wires connected to the launch aircraft and fed from the tips of two opposite fins of the missile. It was flown but never reportedly used in combat. (12:1-6) Since then, guided air-to-air missiles, or AAMs as they will be referred to, have been improved and have been utilized in aerial combat in increasing numbers. A definition is in order.

An air-to-air guided missile, or AAM, is a robot device that can be directed to a target either by commands generated from outside the weapon, by instruments within the weapon, or by a combination of the two methods. By common usage, the term "guided missile" means a robot device that flies through the air or space. The further designation of "air-to-air" describes the location from which it is launched and the location of its intended target. (16:8)

To dispel the biases of the fighter pilots among us, it should be explicitly stated that AAMs are not without their limitations. In our society there will be few free-fire zones in any conflict; and, therefore,

pilots will still be called upon to acquire and close the attack, with or without AAMs. The AAM or "guided bullet" assists, but it does not make the "kill". (16:171) That will always be the realm and responsibility of the fighter pilot.

The need for guided missiles has been forced upon the Services by advancing technology; and, to some extent, this need has been cumulative. Just as with other types of weapons systems, one type of guided missile has historically and inevitably led to the development of another. (16:7) This, when viewed from a position outside the Department of Defense, is not technological iteration at work in the better sense; it smacks of weapons proliferation. This certainly is the wrong time to perpetuate such an image.

#### Purpose and Scope

During the last decade or more, the Navy has been the lead or executive Service in AAM development. The Air Force, however, has maintained a keen interest and sense of participation in this vital defense area through joint Service AAM RDT&E and production programs. The purpose of this project was to review the management of the present day Air Force programs, with a look to the future. While no attempt was made to pass judgement upon one Service's capabilities versus another's, it should be stated that it was this writer's position that the Air Force has a vested interest in fielding the best possible missile systems in relation to present and future Air Force operational needs in the most cost effective manner. If this involves a Navy or an Air Force-sponsored weapon is not the issue. The Air Force's ability to manage programs in this tactical weapons area is.

The scope of this project will be reflected in the general outline of the report. A review of current AAM studies, developments, and programs was made using multi-source data and relying heavily upon Congressional testimony during the FY 1975 and then FY 1976, 7T appropriations hearings. In reviewing these efforts, key management problems surfaced. They ranged from major joint Service program efforts to technology efforts, test and evaluation, and systems acquisition. A look outside the Air Force was made to review external influences, and the project was then concluded with a series of constructive comments which form the findings and recommendations of this report.

#### Organization

Fiscal Year (FY) 1976, as pointed out by Congress during the budget review process, was a year of firsts. It was the first year the Defense budget had broken the \$100 billion mark, and it was the first year the RDT&E portion had gone beyond the \$10 billion level. Congress viewed this with grave alarm. The Defense budget was placed in the context of anticipated Federal deficits in excess of \$50 billion, unemployment rates approaching 8 to 9 percent, and sky-high inflation. In the eyes of Congress, the Defense budget was clearly stretching the capabilities of the United States to the breaking point. (5:1923) It certainly was not the most opportune moment for the Air Force and the Navy to seek approval on two separate and distinct AAM developmental programs as follow-on weapons to the AIM-9 series SIDEWINDER infrared missile. Chapter II discusses the recent past and current Air Force AAM efforts using these two unsuccessful attempts to initiate single Service programs as a point of departure.

The Navy has had the lead in air-to-air guided weapons development during the past decade. In some quarters of the Air Force, however, the view is taken that this was just due primarily to the development of the AIM-7F SPARROW and AIM-9L SIDEWINDER missiles. These missiles are now in, or near, production, as the liturgy goes; and Air Force has had and maintains a continuing interest in AAM technology with specific interest in new sensor guidance techniques. (5:1974) Implicit in this "motherhood" statement is the theme that it is now the Air Force's turn. It is this writer's opinion that the refusal to seriously consider and accept a truly joint Service AAM program continues to be a major management problem area in Air Force AAM RDT&E. This and other problem areas are the subject of Chapter III.

Chapter IV provides a discussion of the external factors which bear upon Air Force management of the AAM RDT&E/Production. Since the United States can never hope to match its potential opponents in numbers of tactical weapons, its only hope of survival is to maintain clear weapons superiority through emphasis on the technology base and upon R&D. The Congress needs to be impressed with the fact that no subject in the entire spectrum of defense problems deserves a higher priority of thoughtful and urgent attention. (25:23) Their influence and the influences of the DOD are the topics of this chapter.

The final chapter provides this writer's conclusions along with some recommendations for improving the management of Air Force AAM RDT&E/Production programs. A checklist in Appendix E consolidates this chapter. This checklist provides an approach toward improving how Air Force does

AAM RDT&E/Production management in the same three main themes that form  
Chapter IV—Preparation, Participation, and Organization.

## SECTION II

### AIR FORCE AIR-TO-AIR MISSILES RDT&E/PRODUCTION PROGRAMS

In the recent past, Air Force activity in Air-to-Air Missiles (AAM) RDT&E has been limited to joint Service participation in the completion of the development of, and initial production/DSARC III of, the AIM-7F SPARROW/ AIM-9L SIDEWINDER, respectively, and some technology efforts in various Air Force Systems Command laboratories. The most recent attempt to initiate the development of two single-Service missiles by the two Departments was dismissed summarily by a watchful Congress, and perhaps rightfully so. This chapter will use that occurrence as a point of departure in order to develop the framework for discussions of the conceptual, technological, and developmental AAM efforts ongoing in the Air Force.

#### The Navy AGILE and the Air Force CLAW

In the years immediately preceding the Congressional budget review for FY 75, the Navy had been engaged in subsystem development and testing of a sophisticated dogfight AAM which they named AGILE. The AGILE, in the Air Force viewpoint prevailing during those years, would have operational parameters far in excess of Air Force requirements. This missile, with thrust vector control and a highly capable guidance and control system, would be able to attain "kills" well past the point 90 degrees to the left or right of the launch aircraft's heading. This seems quite desirable from a Naval fleet defense standpoint, but it would make Air Force wingmen a rare commodity, considering current tactical doctrine. It was considered too much bang for too many bucks and, therefore, Air Force requirements people initiated a search for an alternative.

The Concept for a Low-Cost Air-to-Air Missile (CLAW) was initiated within the Pentagon where considerable studies were made, or contracted for, to investigate the conceptual feasibility of a dogfight missile less capable and less costly than AGILE. Having seen both sides of the argument during that period, this writer remains unconvinced that CLAW, as it was to be developed, would have succeeded; but the discussion is academic for neither AGILE nor CLAW survived Congressional scrutiny during that Fall of 1974.

As the two Services presented testimony for AAM developments to the Senate Subcommittee on Tactical Air Power, they were brought up short on the issue of AGILE versus CLAW. Upon completion of their two presentations, they were asked to explain their divergence. Congress wanted to know why the Air Force and Navy were going off in totally different directions with CLAW and AGILE. It was painfully brought to the Services' attention that both use the same kind of airplanes and are both going to be shooting at a common enemy. (4:4722) In the words of Senator Nunn,

Regarding the short range dogfight missiles, we are seeing a situation where there appears to be a tendency for proliferation of different types of missiles to do much the same job, which is to shoot down an enemy airplane in close-in combat. (4:4653)

#### The Joint Service Approach for a Follow-on Dogfight AAM

Following the FY 75 hearings the AGILE program was cancelled; the CLAW funds were not approved; and the two Services were charged with getting their stuff together. Out of the ashes of the Navy AGILE effort and Air Force's aborted CLAW, a joint Service program has been formulated. The difference between the FY 75 Congressional hearings and the presentations made the following year are as day is to night. In testimony for the FY 76

and transition year budget, the two Services jointly discussed their program for a Short Range Air-to-Air Missile (SRAAM). In this program the Air Force and Navy have committed themselves to defining joint requirements—with the ultimate goal of a common, suitable, affordable short-range dogfight missile. The two Services survived those hearings and were provided over \$16 million to pursue this endeavor for the 18-month period. (6:4634, 4644)

In addition to Service funding, the OSDDR&E/T&E planning included funds for the SRAAM joint test under a Director of Test and Evaluation Program Element 65804D. This test was to evaluate the operational effectiveness of alternate concepts for the next generation SRAAM, envisioned to be a follow-on to the AIM-9L SIDEWINDER, and was specifically in response to the DOD commitment to Congress to test and evaluate various concepts before recommending initiation of engineering development of a new weapon system. High priority has been given to this program and completion is expected as this is being written. (7:14, 15)

Where all this will lead remains speculative. However, there are clear indications that the next generation dogfight AAM will be a joint Service program. Funds in an Air Force program element have been established for the out-year effort, (5:1923) and OSDDR&E/T&E joint test funds are also established. (7:15a) In fact, it is in this OSDDR&E test arena where one finds the most encouragement. The key to this phase of activity for SRAAM is this evaluation of a spectrum of conceptual missile capabilities performed with test seekers captively flown in mock aerial combat on the Air Combat Manuever Range at Yuma, Arizona, and Las Vegas, Nevada. Called AIMVAL, it is truly a joint test in that both Air Force and Navy

are providing fighter aircraft and candidate AAM seekers. (6:4637)

In conjunction with AIMVAL, the two Services are pursuing parallel technology efforts. These projects are composed of subcomponent investigations in the areas of seeker design, propulsion, warhead and fuzing. Of primary interest is cost, complexity, and weight reduction. (6:4643) Before discussing the Air Force technology efforts, another joint Service effort needs to be introduced.

#### The Joint Service Approach for Follow-on Medium and Long Range AAMs

Having learned a valuable lesson in AGILE and CLAW, the two Services are also solidly together in the conceptualization of future medium and long-range AAMs. An Air Force/Navy Tactical Working Group is deeply involved with the establishment of joint Services operational requirements for the next generation of medium and long-range missiles. They are accomplishing their task by assessing both the near-term and the long-term advances in missile technology and by matching these data to the operational needs in both of these timeframes. Working group tasks include the development/evaluation of threat scenarios and the tactics involved with those scenarios which will lead to a view of future missile operational parameters. This, in turn, will be matched with various supporting technologies that are becoming available both in the Navy and Air Force. (23:1, 2)

#### Viewing Air Force AAM Technology Efforts

Air Force technology efforts which could support future AAM developments can be viewed several different ways. Functionally, there are various guidance and control tasks being performed at the Wright Aeronautical Laboratories and at the Armament Laboratory. New low-power, short-range

active radar and long-range passive radar techniques are being tested as well as laser and ultra-violet seeker schemes. Coupled with other functional tasks in propulsion, warheads, fuzing, and aerodynamics, this is but one way to view Air Force AAM technology.

Yet another view can be made when considering the tactical requirement. That is to say, there is a tendency to divide AAMs as short-range dogfight missiles, medium-range missiles, and long-range missiles.

Although no one can accurately state where the divisions are, it is generally accepted that the dogfight missile should perform as near to the launch aircraft as good sense and safety can determine and as far out as one to three nautical miles. The medium-range missile should then be in the next increment of distance whose outer boundary coincides with the limit of human sight, a fairly flexible variable at best. Long-range AAM would then be directed at targets beyond the limit described for medium-range AAM and be limited in its outer reaches by technology, cost, and political considerations. This also is a reasonable way to discuss AAMs but adds to the complexity.

The subject is further compounded when considering the facts that different functional technologies support different range missiles, are being pursued within the Air Force at various different locations, and often by different functional units at the same location. The preceding chapter will treat the compounding complexities of Air Force efforts in AAM development and attempt to highlight some of the problem areas from the management standpoint.

SECTION III

PROBLEM AREAS IN THE MANAGEMENT OF

AIR FORCE AIR-TO-AIR MISSILES RDT&E/PRODUCTION PROGRAMS

If one is willing to accept the fact that technology is not necessarily an American patent and, therefore, we have yet to completely rule out being second best in the next conflict's aerial combat arena, then it becomes obvious that we cannot rest upon our AIM-7F and AIM-9L laurels. Nothing stated here is intended to criticize those two successful missile efforts. Indeed, it remains possible that the requirements for the next generation AAM can be satisfied by another improvement to one or both of those systems. This chapter will avoid the technical issues and attempt rather to shed some light on the management aspects, for it is felt that herein lies the key for large improvements in the Air Force AAM developmental activities.

That improvement is needed in Air Force AAM RDT&E should also be rather obvious. Since weapons unit costs are very high and since fewer real dollars are available for their procurement, we are coming to the point where we can afford to buy fewer than we need. (27:A15) The state of our War Reserve Material in this commodity stands witness to this fact.

As technology advances we will continually be provided with options for improving our combat capability. This is predictable, although the timetable is difficult to estimate. What needs to receive more attention in the Air Force is innovative management. The charge that the Service components and many of their associates have been reluctant to innovate has been a recent criticism. (27:A15) This chapter will review some of the Air Force problem areas in management of AAM developmental efforts.

Management Problem Areas in Current Joint Service Air-to-Air Missile Programs

When AFR 800-2 was published to provide Air Force implementation of DODD 5000.1 philosophy, it was intended to impose a change in Air Force program management of RDT&E programs with emphasis on decentralization of responsibility, reduced formality in procedures, and redirection of development control to the implementing command unit. The actual effects of these policy changes have yet to be realized in the RDT&E of AAMs even though the regulation dates back to July 1971. (19:220, 221)

In April 1975 the Deputy Program Managers (DPM) who are the Air Force program directors for three major joint Service missile programs for which Navy is lead Service (AIM-7F, AIM-9L, and an air-to-ground missile program) expressed their concern for the organizational structure imposed upon them by Air Force Systems Command. In their opinion, they lacked sufficient on-site functional management support. Being organizationally responsible to the Armament Development and Test Center (ADTC), Eglin AFB, Florida, while being physically located within the Navy program manager's office in Washington, D.C., was cited as contributing to the difficulty or impracticality of obtaining lateral support. Clear lines of authority and responsibility were missing according to the DPMs.

The DPM's recommended solution was based primarily upon additional manpower authorizations as follows: Given sufficient manpower the Air Force DPM would superimpose a thin intermix systems program office of Air Force personnel over the Navy matrix program office already established. They would assume total control and reporting responsibilities for those Air Force unique portions of these joint Service missile programs. There

would remain a liaison-only function at ADTC performed within the Deputy for Armament Systems. Implicit in all this was that they would then be directly answerable to the ADTC Commander and then AFSC; a position equal in the minimum layering approach for their Navy counterparts. (11:1, 2)

What has evolved since that time does not reduce the layering at all. In Appendix A is a proposed organizational outline for a Missile Systems Program Office under the ADTC Deputy for Armament Systems. At this writing, it appears assured of approval and most likely will be adopted. For all the benefits that the establishment of this office can be expected to provide, it must be realized that in those joint Service AAM programs the DPM now has another layer of Air Force management. This will add to an already serious problem in that communications between the AAM program office and Air Force Headquarters are severely restricted, each successive higher layer of organization requiring detailed formal review before critical information can be passed up through the chain-of-command. (19:220) A representative organizational diagram, Appendix B, will show that even the Air Force Deputy Program Manager for Logistics now has less layers to the commodity command level than does the Deputy for Air Force Programs.

It is apparent that the ADTC strongly desires and equally strongly needs to develop a capability in the AAM discipline--both from a technology and from a management standpoint. One of the ways to assure the available talent remains available is to securely hold it within the organizational hierarchical structure. That is what has happened with the AIM-7F and AIM-9L Air Force programs. It remains to be seen if this will be beneficial to the overall ADTC capability for management of AAM programs, for it is this writer's impression that at the grass-roots level the technologists

and systems people at Eglin look upon the Air Force AIM-7F and AIM-9L people in Washington as "the competition".

#### Management Problem Areas in Current Air Force Air-to-Air Missile Technology Efforts

In the preceding chapter was presented a short discussion concerning ways to classify and, hence, manage AAM technology efforts. It would be beneficial to expand upon the problem areas implicit in that quick overview. Figure 1 is a representative view of the type of complicated matrix the Air Force finds itself in with respect to AAM programs. While this particular diagram represents the ADTC, it can also be considered a pictorial of the Headquarters AFSC organization.

Figure 1 displays on its front face three managerial functions--plans, subsystems technology, and systems engineering. These represent the way both Headquarters AFSC and ADTC are presently structured. Along the right face of the figure, there is a breakout of missiles according to the technical parameter range. Across the top face is a breakout according to the development continuum from preliminary design through to production. Even this depiction is an over-simplification for the Air Force and AFSC have imposed yet another separate management structure based upon the type of aircraft which would launch an AAM. That is to say, this discussion has almost entirely been based upon tactical fighter AAMs and will exclude bomber defense missile for the sake of clarity.

The complicated management structure for Air Force AAM technology efforts that Figure 1 depicts can best be explained by presenting a few examples. One project that has met with a degree of success in feasibility demonstrations between 1972-1974 was PAVE BRAZO--an application of passive

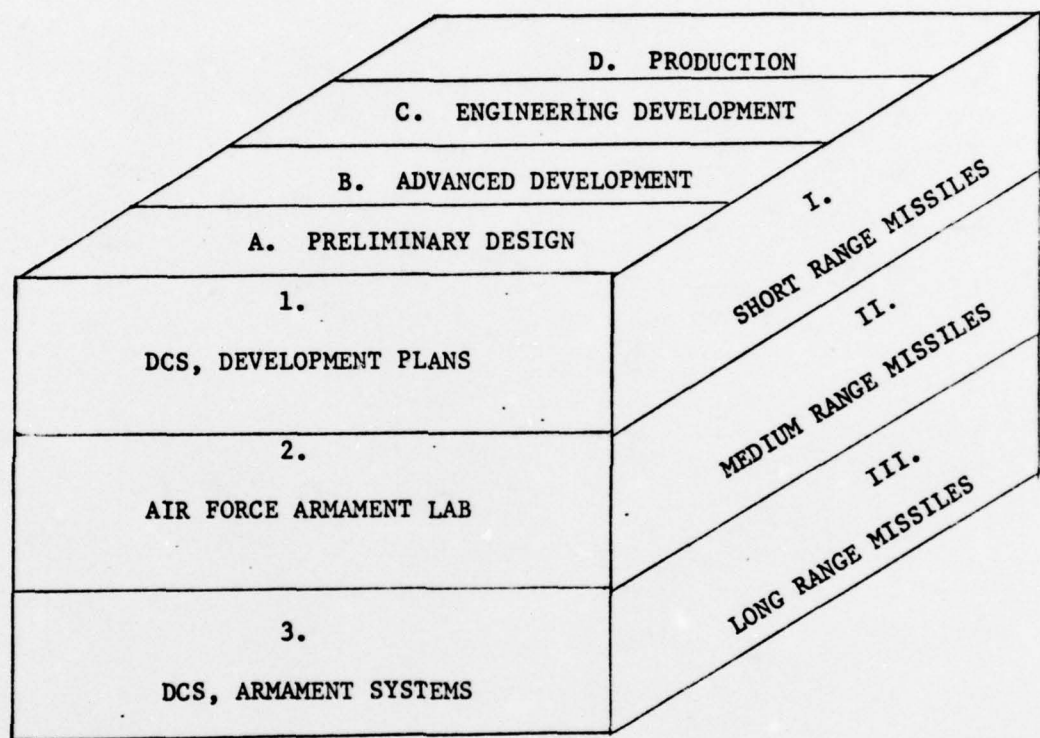


FIGURE 1. THE PRESENT MANAGEMENT-TECHNICAL PARAMETER-DEVELOPMENT CONTINUUM MATRIX FOR AIR FORCE AIR-TO-AIR RDT&E/PRODUCTION

anti-radiation guidance to long-range AAM. This project is managed in the Air Force Armament Laboratory and is an advanced development effort. PAVE BRAZO fits into the MANAGEMENT-TECHNICAL PARAMETER-DEVELOPMENT CONTINUUM matrix as 2-III-B. Compare PAVE BRAZO with the AIM-7F SPARROW program which fits the matrix as 3-III-D (see Figure 1).

The dogfight missile program aforementioned as the joint Service SRAAM is being managed in the new Missile Systems Program Office, Deputy for Armament Systems. Since the Services are back to the conceptual stage with some subsystems component testing, this program fits the matrix as a 3-I-A/B. The companion effort for joint Service follow-on medium and long-range AAM is being managed by HQ AFSC and at ADTC as a development plans function. It would map within the matrix as a 1-II/III-A (see Figure 1).

Similar comparisons could be made for other Air Force AAM tasks and subtasks which would further complicate the picture and serve no useful purpose in this discussion. The intent in attempting to present some random Air Force AAM efforts against a backdrop of the MANAGEMENT-TECHNICAL PARAMETER-DEVELOPMENT CONTINUUM matrix is to display the complexity of the Air Force structure in this vital area. To whom does the Air Force Systems Command Commander turn when he has a question on AAMs? Similarly, who is the AAM focal point at ADTC? Surely the DCS Armament Systems' new Missile Systems Program Office is a place to start, but not if it is a laboratory program or an effort now funded and managed by the development plans shop. The problems are compounded, as previously described, by the two production, missile programs for AIM-7F SPARROW and AIM-9L SIDEWINDER with the Air Force DPMs being physically separated from ADTC as they are.

### Management Problem Areas in Air-to-Air Missile T&E

In the past the DOD has been severely criticized for its inbred testing posture. Some attempt has been made by the Services to acquire an independent testing capability; however, little has really changed that can be perceived when looking in from outside DOD. Instead of having truly independent operational testing of weapons before procurement, which was recommended over five years ago by the Blue Ribbon Panel, the Defense Department developers continue to be the judge and jury of the weapons systems they sponsor, remains a familiar charge. (27:A15) It is apparent that T&E will continue to be a problem area for weapons development in general and, with such close and recent scrutiny by the legislative branch, with AAMs in particular.

There is such a strong concern for the application of proper test and evaluation precepts that the Office of the Director of Defense Research and Engineering, Deputy Director for Test and Evaluation (OSDDR&E/T&E) and the Defense Science Board Task Force have published a checklist for testing. This checklist provides guidance in evaluating T&E activities for missile systems throughout the complete DSARC process and is very explicit for it recognizes some important real world problems. It recognizes, for instance, that previous financial and temporal pressures have forced competent program managers to compromise on their principles and depart from the rules of sound engineering practices. Following this checklist will continue to be a financial burden and, hence, a management problem, but it may put OSDDR&E/T&E in the program manager's corner at DSARC. (26:vii)

The OSDDR&E/T&E is deeply involved in AAM testing and this can be readily seen in the Weapons Effectiveness Joint Test that was recently completed. This test was sponsored by that office to provide realistic terminal effectiveness data from operational flight tests of Navy and Air Force aircraft on the Services' present day AIM-7 and AIM-9 series missiles. The data is being used to validate a methodology for predicting probability-of-kill and other performance parameters of AAMs and will be of great benefit in connection with the follow-on effort AIMVAL, now in progress, and with the next generation AAM developments. (7:11)

The OSDDR&E/T&E has long range plans to initiate new joint Service AAM tests in FY 77 and has budgeted \$6 million for that fiscal year. Proposed tests will be coordinated with the Services and selected candidate tests will then be subjected to a feasibility determination to ascertain if the test objectives themselves are achievable. They must be capable of resolving current weapons systems operational problems or providing information for design of future weapons systems. (7:16) The program manager for future Air Force AAM efforts needs to concern himself with the evaluation of such tests for they will form some of his hurdles in the future.

Management Problem Areas in Utilizing A Systems Management Approach for Air Force Air-to-Air Missiles Programs

Recently a Program Management Assistance Group (PMAG) review of the ADTC pointed out some very specific deficiencies with respect to the Air Force's capability to use a systems approach for conventional armament acquisition activities. While the PMAG charter also included a review of the GBU-15 Modular Glide Bomb program, the focus of this discussion will be upon the results of their assessment of the Center's capability to

perform as a systems acquisition organization, or a so-called product division, as it pertains to AAMs. (17:1)

The PMAG assessed ADTC against what the group felt was needed for proper systems acquisition-product division criteria (see Appendix C). (17:36) The Center was found critically lacking in engineering capability (integration skills), logistics support (planning), and training (specialized schools, on-the-job training). Every other function was deemed marginal with the exception of staff business operations (procurement support) and facilities which were both found fully adequate to the systems acquisition task. (17:41)

A brief summary of the findings of this PMAG review should be placed in the context of this key finding: 'Armament systems funding was generally low for full scale development programs.' (17:40) It is this writer's belief that this one factor underlies all the other findings of the PMAG.

The Air Force Armament Laboratory was found to be overly involved in day-to-day developmental problems and not sufficiently focused upon maintaining the technology base. Technology funds were found to be used to support systems development/acquisition, and program transition was being driven by funding constraints, rather than readiness. Basically, the laboratory was found to be in competition with the Center's Deputy for Armament Systems for the available technical talent. This competition was found to be both unhealthy and inefficient. (17:37, 42)

In the area of present program management capability, ADTC was found to have an inadequate formal review process and systems development concept. The Center lacks people in the key program management areas of configuration management, business/cost and schedule, and business/

procurement. (17:38) The manpower and organizational problem areas were presented against the forecast that armament systems acquisition is projected to double in the near future while there is no projected increase in overall ADTC manning. Also, it was found that present ADTC organization and manpower allocations do not effectively support the acquisition mission. (17:49)

Most of the issues discussed in this chapter are management issues which are internal to the Air Force and primarily within Air Force Systems Command; the exception being the OSDDR&E/T&E impact on the present and future AAM test efforts. Before attempting to resolve any of these issues, it would be prudent to summarize the influences external to the Air Force, to include the Congressional influences and a broader view of the OSD.

SECTION IV  
EXTERNAL FACTORS WHICH BEAR UPON  
THE MANAGEMENT OF AIR FORCE AIR-TO-AIR  
MISSILES RDT&E/PRODUCTION PROGRAMS

There is a tendency within today's R&D community to attempt to hold one's breath awaiting the outcome of the 1976 Presidential sweepstakes. This writer feels that such a device is imprudent for the important reason that, whichever faction ascends to power in the Executive Branch, they will inherit the FY 1977 budget--and it is becoming a landmark year.

This chapter will review the external influences now ongoing in Washington which will affect future Air Force AAM efforts. The President's budget is a big one and signals a reversal in past trends for DOD. At the same time the Congress is operating with a brand new budget oversight structure and has also provided legislation which will restrict future Foreign Military Sales (FMS). The DOD has recently reviewed policies governing major systems acquisition and new directives are expected as a result. All of these are factors external to the Air Force which will influence future AAM developments.

The Influence of Congressional Oversight

Under the Constitution of the United States, Article I, Section 8, the Congress shall have power to lay and collect taxes...and to provide for the common defense...to declare war...to raise and support armies...to provide and maintain a navy. Make no mistake--our present Congress fully intends upon exercising as much of its Constitutional authority as it can. And yet in this year's State of the Union message, President Ford

announced the FY 1977 defense budget would show "an essential increase" representative of the necessity of American strength for the real world in which we live. (2:A12) His message did not go unheard.

According to a leading critic,

No sounding trumpet stirs the hearts of weapons makers quite like a call for more military spending.

It is his viewpoint that the President's request was joyfully received by the top defense contractors for each weapon system is supported by a formidable lobby made up of the Pentagon brass who want the system, the defense contractors who build it, and the congressmen whose constituencies enjoy the economic benefits. (1:F7)

Without commenting upon the accuracy or veracity of this recent criticism, the future Air Force AAM program manager might well be served reflecting upon it. Certainly the Congressional committees will take an unusually detailed look at the Defense authorization request this year, and for reasons which are separate from the size of the request and the criticism that it draws. The main reason is the shift to the new budgeting system set up by the Congressional Budget and Impoundment Act of 1974.

(24:F)

In the past our budgetary process has been seen as an annual Defense debate. This annual Defense debate is defined as the lengthy annual duel which is witnessed by the public at large as between Defense critics and Pentagon defenders whereby the critics thrash the defendants about the head and shoulders because of cost overruns and the failure to reorder priorities to serve domestic needs. The truth of the matter is that funds available for weapons of Defense have been cut proportionately more than

the rest of the Defense budget. In real terms, weapons funds have been reduced by 25 percent in the last decade. (27:A15) Apparently, the Congress is becoming aware of this large reduction in real defense spending, for the pendulum is swinging in another direction.

Touted as a sharp reversal of recent Congressional trends, the latest report on the Senate and House Appropriations committees indicates they will submit their budget recommendations to the new House and Senate Budget committees with virtually no cuts in President Ford's defense spending request for FY 1977. At this writing, it appears that Congress has been listening to, and are concerned with, the grave comparison of defense capabilities of the United States vis a vis the Soviet Union. (22:A2) In another area, FMS, they are going to be more restrictive.

Congress has taken upon themselves yet another Defense oversight activity--FMS. Congress wants, and apparently will receive, more information of, and more control over, foreign sales of U.S. defense materials. The DOD FMS for 1974 was \$10.8 billion--an all time high--and the current fiscal year is forecasted to involve \$9.8 billion in FMS. (10:A2) This is topical for future Air Force AAM program managers for the U.S. is now selling to foreign countries its latest fighter aircraft--aircraft for which new AAMs will be developed. The government of Israel will be the first to buy the F-15; a large number of F-16 aircraft will be part of the NATO force mix; and Saudi Arabia is only the latest to buy the F-5 with 110 aircraft to be purchased as the first stage in their Air Force modification program. (14:A2)

Just what current or new AAM these countries will use on U.S. exported fighter aircraft remains to be seen. Indications from the experiences of

the Israeli War brought out the point that the Israelis found that the AIM-9D SIDEWINDER needed a warhead that is better than its present warhead. They claim that an AAM developed in their own country has a better warhead and has demonstrated a better kill capability in actual combat.

(4:4721) Developed by Rafael Armaments Authority in Israel, the SHAFIR missile embodies a conventional slender planform of a heat-seeking missile with a 25-pound warhead said to be an improvement over the AIM-9 SIDEWINDER of U.S. design. In fact, it appears to be an Israeli copy of the U.S. SIDEWINDER missile. (9:9) There are more free-world countries in the competition. France has the Matra developed Magic 550, and Great Britain has a Hawker Sidderly short-range dogfight missile, their SRAAM 100, designed to be (coincidentally) low cost, lightweight and highly maneuverable. (9:3)

#### The Influences of Departmental Defense Oversight

Our new Secretary of Defense has been accused of a lack of defense background knowledge. Whatever his shortcomings may prove to be, he must be applauded for his initial impressions as they pertain to management. Secretary Rumsfeld apparently wants to be the first Defense Secretary since Robert S. McNamara to stress management. (8:A19) The department has been well prepared for just such an approach.

A recent ad hoc committee has completed a review of Army, Navy, and Air Force recommendations regarding the management of weapon systems acquisition at the OSD level. This group, headed by Dr. Alexander M. Flax, concerned themselves mainly with policy, procedures, and organization within the Office of the Secretary of Defense, and with the interfaces with the Military Departments. (20:1)

One of the key recommendations of this Acquisition Advisory Group (AAG) was that a new DOD Directive be issued governing acquisition management to clearly set forth the authority, responsibility, and accountability of program managers. Also to be part of this new directive was an affirmation of the requirements for higher level review and decision at DSARC milestones I, II, and III, and an emphasis on the accountability of the reviewing executive for his decisions. This directive would establish clearly defined command lines for systems acquisition from the Secretary of Defense to the lowest program manager, and provide authorization/delegation of authority to those program managers to trade-off cost, schedule and performance within specified ranges. (20:57)

These and other far-reaching recommendations have been favorably received. The Deputy Secretary of Defense Clements has agreed with the AAG recommendation and considers it appropriate at this time that a more comprehensive DOD directive governing acquisition management be promulgated. Accordingly, he has directed the Commandant of the Defense Systems Management School (DSMS) to draft a new directive which is responsive to this AAG finding. This directive is to be coordinated with the DSMS Policy Guidance Council and to be submitted to the DEPSECDEF prior to April 1976. At this moment, the DSMS is actively engaged in this undertaking. (3:5)

How this new directive will impact Air Force AAM programs is unclear. The hope is that more clearly defined lines of authority and accountability will aid the systems acquisition function. With increasing Congressional oversight on defense budgetary matters and foreign defense sales, and with foreign competition, the program manager for future Air Force AAM programs

would certainly benefit from a new directive which reduced the layering and, hence, the amount of reviewing staff levels who can say no but have little accountability for the developmental or production system in question.

## SECTION V

### CONCLUSIONS AND RECOMMENDATIONS

Too often in preparing a document of this type the author will find that, in spite of his predilections, he cannot in good conscience find a "better way" or provide constructive comments. The document then becomes destructive, critical, and without merit. It has been this writer's intent to state what has been his perception of the situation as supported by the available background material. Hopefully, there are some constructive comments to be made which may assist in improving the management of Air Force AAM efforts.

The conclusions and recommendations which are offered here and provided in checklist form in Appendix E concern three main themes. Actively engaging the Air Force in future AAM RDT&E after a number of years of "falling-on-our-own-spears," and then buying another Service's weapons will involve some preparation. Following the comments on preparation, there will be a discussion of participation--of the people necessary to do the job. The final topic will be the organization--the structure recommended for better management of Air Force AAM RDT&E/Production.

Action is required at all levels within the Air Force components from HQ USAF right down to the Product Division (Center) and Laboratory level. The checklist commentary attempts to indicate where primary and correlary actions could take form; the following text makes no attempt to do this specifically as it does not need to stand alone as the checklist is intended to do.

Improving Air Force Air-to-Air Missiles RDT&E/Production Management  
Through Preparation

The future focus in U.S. defense systems will be more and more upon multi-component utility. Therefore, our new weapons systems will become increasingly joint Service RDT&E efforts. No attempt has been made in this report to make technical assessments of which Service can make the better missile system. No matter which Service has the lead in future AAM RDT&E, the Air Force needs to improve its program management posture. The future short-range missile, SRAAM, is a case in point.

A SRAAM decision is planned for December 1976. Both Services recognize that, following this decision milestone, there will be a designated lead Service--if in fact there is to be a common dogfight missile as a follow-on to the AIM-9L SIDEWINDER. In order to support such a program technologically, the Navy lead laboratory will be at the Naval Missile Command, China Lake, California. The management will most likely be through a designated project management office in the matrix organizational structure at Naval Air Systems Command Headquarters, Washington, D.C. The Air Force, on the other hand, counts upon its technical support as coming from industry with management through the Armament Development and Test Center, Eglin Air Force Base, Florida. (6:4645)

Recommendations made by the recent Program Management Assistance Group review of ADTC included a reorientation of the Center's Armament Laboratory toward technology base efforts. Hardware development should be incidental to development of the technical data base, criteria, and specifications. At the same time the PMAG recommended an increase in the use of prime/integrating contractors. Coupled with these technical

considerations, the PMAG recommended an overall systems approach toward weapons RDT&E with specific attention given to acquisition planning and War Reserve Material Management. (17:45-47, 60) These recommendations should be instituted. Thought should be given in the preparation for managing the next AAM development in a two-Service arrangement which will utilize the ADTC/SD23 Missile System Program Office as the initial focal point. Some of the men and resources which will form the cadre for such a development are already assigned to this office. These people and the decision-making levels with the authority, accountability, and responsibility for AAM RDT&E/Production have to accept and prepare for the inevitability of multi-service missile efforts in the future.

Those involved in future Air Force AAM programs will have to contend with more DOD and Congressional oversight than ever. Some of the "assistance" will in fact be helpful; the remainder will nonetheless be a constitutional requirement. The key to preparation is through education, and this means getting the involved people truly involved.

#### Improving Air Force Air-to-Air Missiles RDT&E/Production Management Through Participation

The key people who will participate in future missile developments for the Air Force will be the program/project managers at the product division and his immediate assets, his systems technical focal point at the commodity command level, and his program element monitor at Air Staff. The participation in Air Force AAM programs in the past can best be described as spastic, fragmented, and (possibly best of the three) almost nonexistent. Present day indications show an improvement, and perhaps the trickle-down of some recent innovative changes at Air Staff will

improve this type of participation. Recently the Air Force Deputy Chief of Staff for Research and Development has had an organizational shift which placed the weapons requirements function and the weapons engineering function in the same shop. Make no mistake--the Air Staff action officers neither establish requirements nor engineer the systems that will fill those requirements. They do perform the integration function between the coordinative level (in this case, the user command and the development command) and the strategic level, CSAF, and the Service Secretary.

As a participatory consideration, this means the people working on the user's statement-of-need are in a closer structural position to the people staffing the developer's answer to the need. This is one way to provide a systems view at the higher headquarters level. The participants at that level are now talking together. More will be discussed about the other program team members' interactions when the subject of organization is dealt with in-depth.

At Headquarters AFSC, and even more so at the ADTC, the participants need to stand back and take a broader view of AAM development in order to acquire a systems acquisition approach. There is a strong need to recruit and retain experienced systems people, and to train and educate those good people already available. (17:45-47, 60) Key educational subjects which should be considered include the governmental budget process, the DOD Planning, Programming, and Budgeting System (PPBS), and how the two are interfaced each year in the President's budget. In this educational attempt, one must not forget to include the supporting functional elements as well as the higher echelon staff members who should also be provided an air-to-air missiles systems view through program management as

maintained by the program office. (13:66)

An addition to the aforementioned key educational considerations, the people involved in future AAM developments in the Air Force should have a broad Service background. Consideration should be given to people who have participated in joint Service programs, in international R&D, and who have had training in systems acquisition program management as well as an operational background.

Improving Air Force Air-to-Air Missiles RDT&E/Production Management Through Organization

In Chapter III a graphic display of the present complicated MANAGE-  
MENT-TECHNICAL PARAMETER-DEVELOPMENT CONTINUUM was provided (Figure 1) along with textual examples of how such a system of intermixed AAM system and subsystem developments attempted to interface. Surely there is a better approach. The PMAG has made some general recommendations for a new ADTC image--a general reorganization which would move to a "standard" product division and therefore accommodate anticipated future growth of armament acquisition activities. (17:60) The near-term and far-term organizational options appear in Appendix D. Note that one of the far-term options includes a Deputate for Air-to-Air Armament Systems.

This far-term organizational option provides interesting food for thought; however, the Air Force isn't ready to make such a big step at this time--a position in which this writer concurs. There are, however, adjustments that can, and should, be made to how we do business in AAM RDT&E/Production which can be reflected in how we organize to accomplish these tasks.

One such business adjustment involves the minimization of program

elements under which various AAM RDT&E projects and tasks are directed.

If the new guidance technology, propulsion technology, aerodynamic technology, seeker technology, and whatever, could be placed in one encompassing program element (PE), a 63XXX element which included funds for paper studies, then the management problem would be reduced proportional to the reduction in the number of present PEs which fund such efforts today. Similarly, the engineering development PEs should be kept to a minimum and this all could be reflected in how we organize to do Air Force business.

Air Staff's recent, and aforementioned, R&D reorganization provides a nearly "cradle-to-grave" approach which needs only a close working relationship with the staff logisticians to make it complete. At AFSC the technical focal points could be reduced from a few offices in the development plans function, three or more gentlemen monitoring laboratory efforts, and a focal point in Systems to one systems technical office for air-to-air missiles. Figure 2 shows how the production division MANAGEMENT-TECHNICAL PARAMETER-DEVELOPMENT CONTINUUM could also be simplified.

The simplified version of AAM RDT&E depicted in Figure 2 could be accomplished without awaiting a coordinated reduction in PEs which fund AAM tasks. The present ADTC/SD23 Missile System Program Office should be made the focal point for all of ADTC's AAM efforts. The most effective, and probably the single most important, method for control of the projects within a program is through control of the funds. This is the Golden Rule. With complete control of the funds, the AAM program manager would be in a position to issue directives supported by allocated dollars to the functional support organizations and could monitor/control their response to the Air Force AAM program requirements. (18:25)

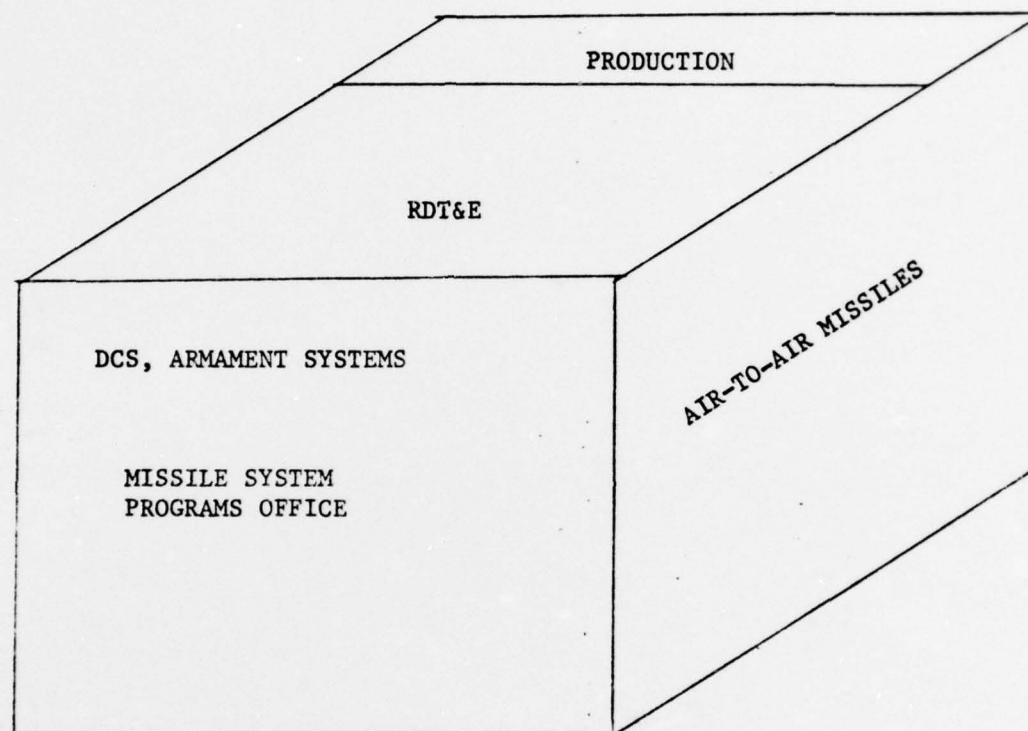


FIGURE 2: A SIMPLIFIED MANAGEMENT-TECHNICAL PARAMETER-DEVELOPMENT  
CONTINUUM MATRIX FOR AIR FORCE AIR-TO-AIR RDT&E/PRODUCTION

It should be noted that no attempt has been made to determine which of the types of program management offices ADTC/SD23 should become. It is recognized that the choice of either A) a vertical organization or B) a matrix organization for all program management is not a feasible solution to program deficiencies, for each organizational type has its benefits and liabilities. The vertically organized all-in-one payroll organization has the best record of success in development programs with a high degree of urgency, concurrency, technical span, and cost. It prospers at the expense of functional organizations, however, and there are practical limitations on the total number of vertical organizations which can be manned with qualified personnel and managed through an ad hoc or special reporting relationship outside the normal chain-of-command. (21:81)

Figure 2 does not give any special relationships to AAM RDT&E/Production. It does, however, attempt to reduce and normalize the multiple, and perhaps fallacious, divisions of missile tasks/projects/efforts so that a single focal point can emerge. Indeed, the production has been left separate from RDT&E for transition to the logisticians should occur as quickly as possible to free the developmental personnel assets for RDT&E applications.

Another function the Missile System Program Office should perform is a liaison function. Once a program management cadre has been formed and a major program has emerged through the DSARC process, the desire for minimum layering would seem to indicate that the specific missile system program manager be removed from the ADTC/SD23 "basket" program office. He should begin to operate autonomously under his own charter and it is recommended that his authority, accountability, and responsibility proceed

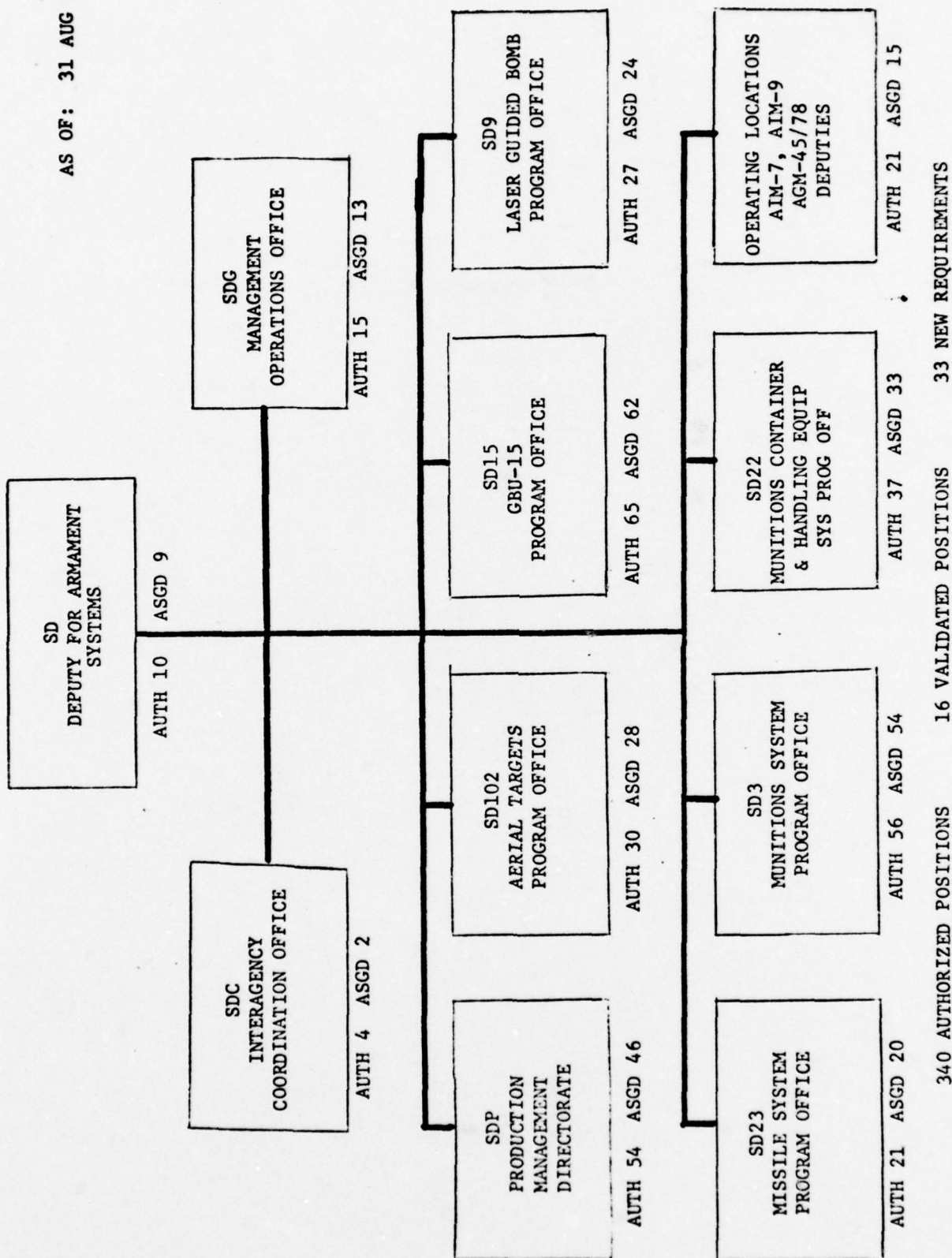
through the Center Commander, the AFSC Commander to the Chief of Staff. This should be the arrangement for the present major program Air Force Deputy Program Managers on the AIM-9L and AIM-7F programs.

The comments presented here concern the preparation for, the participation in, and the organization of improved Air Force AAM RDT&E/Production. They are by no means all inclusive and can only be offered as a partial aid to general improvement in systems acquisition management as it pertains to the armament systems in question. Innovation and flexibility remain in the program manager's prerogative and, while he has a right to expect management flexibility, what he will get will be somewhat less than his expectations. It will be a struggle. Higher echelons and the staff will tend to standardize and insist upon the use of familiar procedures, techniques, and methods. Avoidance of exceptions to the rule is the byword and deviations are rarely welcome. (13:7) There is a better way and the path is through better management. Better management needs to be applied at all levels, discriminantly, and not at the expense of other programs. For those involved in Air Force AAM RDT&E/Production at all levels, this report should provide a mirror for reflection. Those who join this writer in the belief that the Air Force deserves the best possible AAM systems in relation to its operational requirements, and are willing to consider the application of innovative but reasonable management to the task, will help assure that this type of weapon can be acquired in the most cost-effective manner.

APPENDIX A

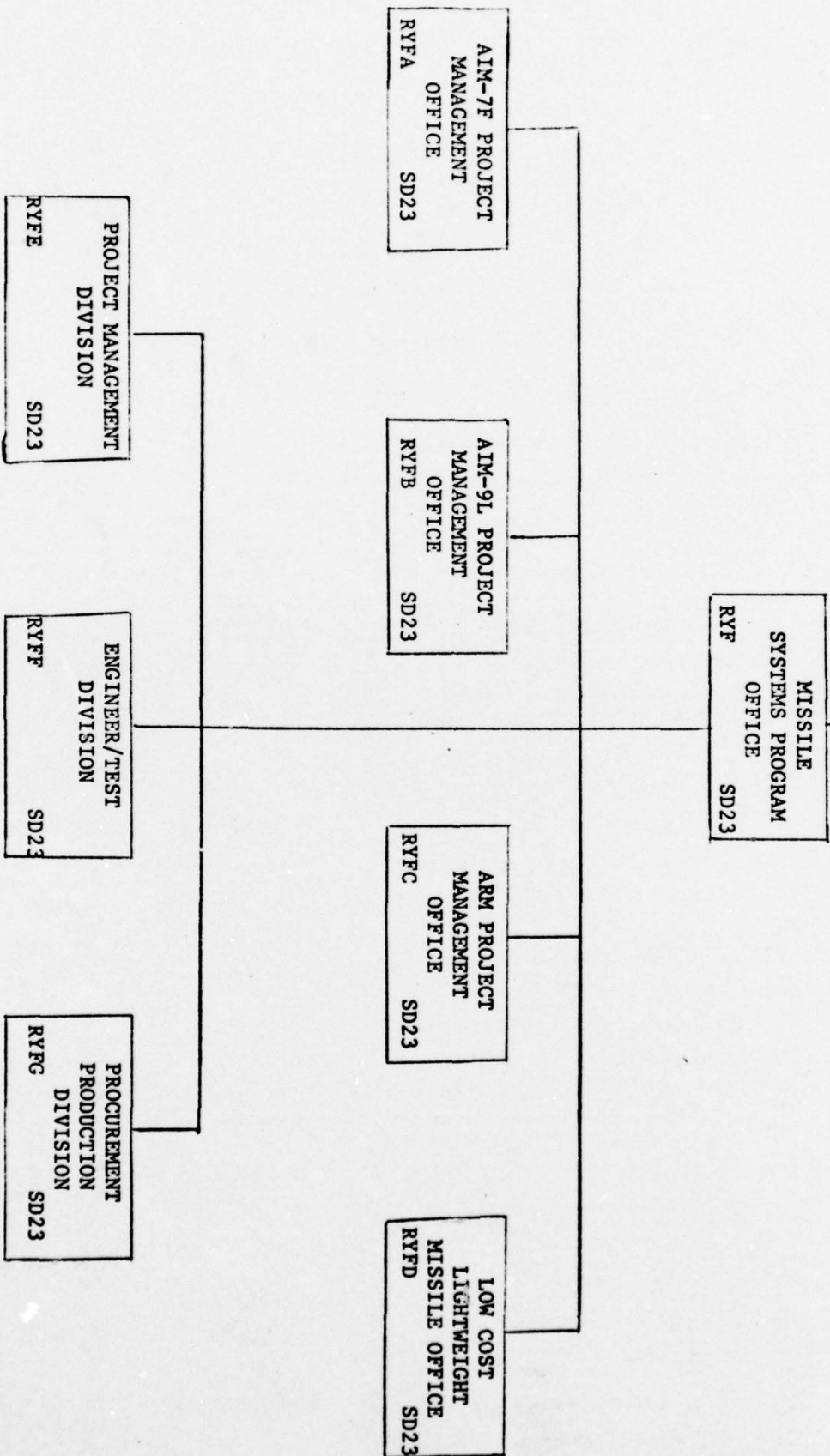
Organizational Outline for the Missile Systems Program Office within  
the Armament Development and Test Center's Deputy for Armament Systems

AS OF: 31 AUG 75



340 AUTHORIZED POSITIONS 16 VALIDATED POSITIONS 33 NEW REQUIREMENTS

DEPUTY FOR ARMAMENT SYSTEMS



#### MISSILE SYSTEMS PROGRAM OFFICE

Manages the Validation, Full-Scale Development, and Production phases of assigned air-launched missile systems.

Responsible for the management of post-Conceptual Phase tactical air-launched missile system prototype programs; provides technical direction to the contractors.

Prepares periodic program status reports.

Prepares and obtains coordination and approval of all contractual and other procurement documents.

Maintains close liaison with users and other appropriate DOD agencies to keep abreast of changes in operational needs and to assess the status of other tactical and air defense air-launched missile systems which will impact air-launched missile development from a total weapon system perspective.

#### AIM-7F PROJECT MANAGEMENT OFFICE

Responsible for the development, test and evaluation, production, and logistic support of the SPARROW III (AIM-7) Missile Systems on a joint service basis to satisfy Air Force needs.

Insures deliveries of missiles and support equipment on time to meet training and operational requirements schedules within funds allocated.

Represents ADTC/SD23 as single Air Force point of contact for all matters relating to AIM-7F missile systems.

Obtains functional support from other Missile Systems Program Office activities and the Munition Container and Handling Equipment SP0 for support equipment, procurement, test management, aircraft interface, and management and financial matters.

#### AIM-9L PROJECT MANAGEMENT OFFICE

Responsible for the development, test and evaluation, production, and logistics support of the Sidewinder AIM-9L missile system on a joint service basis to satisfy Air Force needs.

AIM-9L PROJECT MANAGEMENT OFFICE (CONT)

Insures deliveries of missiles and support equipment on time to meet training and operational requirements schedules within funds allocated.

Represents ADTC/SD23 as single Air Force point of contact for all matters relating to AIM-9L missile systems.

Obtains functional support from other Missile System Program Office activities and the Munition Container and Handling Equipment SPO as necessary to support Air Force requirements for support equipment, procurement, test management, aircraft interface, and management and financial matters.

ARM PROJECT MANAGEMENT OFFICE

Responsible for the development, test and evaluation, production, and logistic support of the AGM-458 SHRIKE, AGM-780 STANDARD Anti-Radiation Missile (ARM), and the AGM-88 HARM missile systems on a joint service basis to satisfy Air Force needs.

Insures deliveries of missiles and support equipment on time to meet training and operational requirements schedules within funds allocated.

Represents ADTC/SD23 as single Air Force point of contact for all matters relating to AGM-458, AGM-780, and AGM-88 missile systems.

Obtains functional support from other Missile Systems Program Office activities and the Munition Container and Handling Equipment SPO for support equipment, procurement, test management, aircraft interface, and management and financial matters.

Note: The above three (3) Project Management Offices are planned, organized, and controlled as integrated Service Projects by jointly manned Project Offices within Headquarters, Naval Air Systems Command. Specific authorities and responsibilities of the Project Management Offices are provided in the appropriate Joint Service Charters approved by HQ USAF/Naval Air Systems Command.

#### LOW COST LIGHTWEIGHT MISSILE OFFICE

Responsible for the total management of the Air Force developments under the Air Force/Navy Advanced Short Range Air-to-Air Missile (SRAAM) Program.

Serves as ADTC focal point for the Advanced SRAAM Program.

Serves as OPR for lightweight and/or low cost missile systems resulting from the current Advanced SRAAM Program.

Provides guidance to the various AFSC laboratories on required technology efforts.

#### PROJECT MANAGEMENT DIVISION

Responsible for the management of assigned post-Conceptual Phase tactical missile programs.

Manages the AFSC portion of assigned tactical missile product improvement programs.

SPO focal point for joint service activities not related to a specific missile system.

Interfaces with planning organizations in the Directorate of Development Plans and the various Air Force laboratories for the purpose of assuring the infusion of new technologies into on-going development programs.

SPO focal point for Technical Needs.

#### ENGINEERING/TEST DIVISION

Provides the technical support required to manage assigned programs.

Provides technical inputs to Program Management Plans, Statement of Work, and Request for Proposals.

Provides technical support for design reviews, Functional Configuration Audits, Physical Configuration Audits, Source Selection activities and Production Readiness Reviews.

#### ENGINEERING/TEST DIVISION (CONT)

Manages all activities required to assure test interaction is accomplished with agencies outside the Missile Systems Program Office.

Programs for test facilities and support equipment requirements

Determines acceptability of test results and furnishes results to other SPO personnel as required.

Insures proper test reports are prepared and distributed.

#### PROCUREMENT/PRODUCTION DIVISION

Prepares and obtains coordination on all contractual documents.

Manages all contract negotiations and awards and elements of the contract presentation.

Responsible for obtaining assessments of producibility and production planning for SPO programs.

Establishes system program financial objectives, and cost control management where applicable.

Consolidates, presents, and defends budgets and financial plans. Receives and evaluates financial data. Allocates program financial resources.

Prepares data for quarterly financial reviews and periodic program status reports.

Provides guidance to contractor and government agencies in procedures and organizations for configuration management activities and maintains surveillance.

Maintains configuration status accounting.

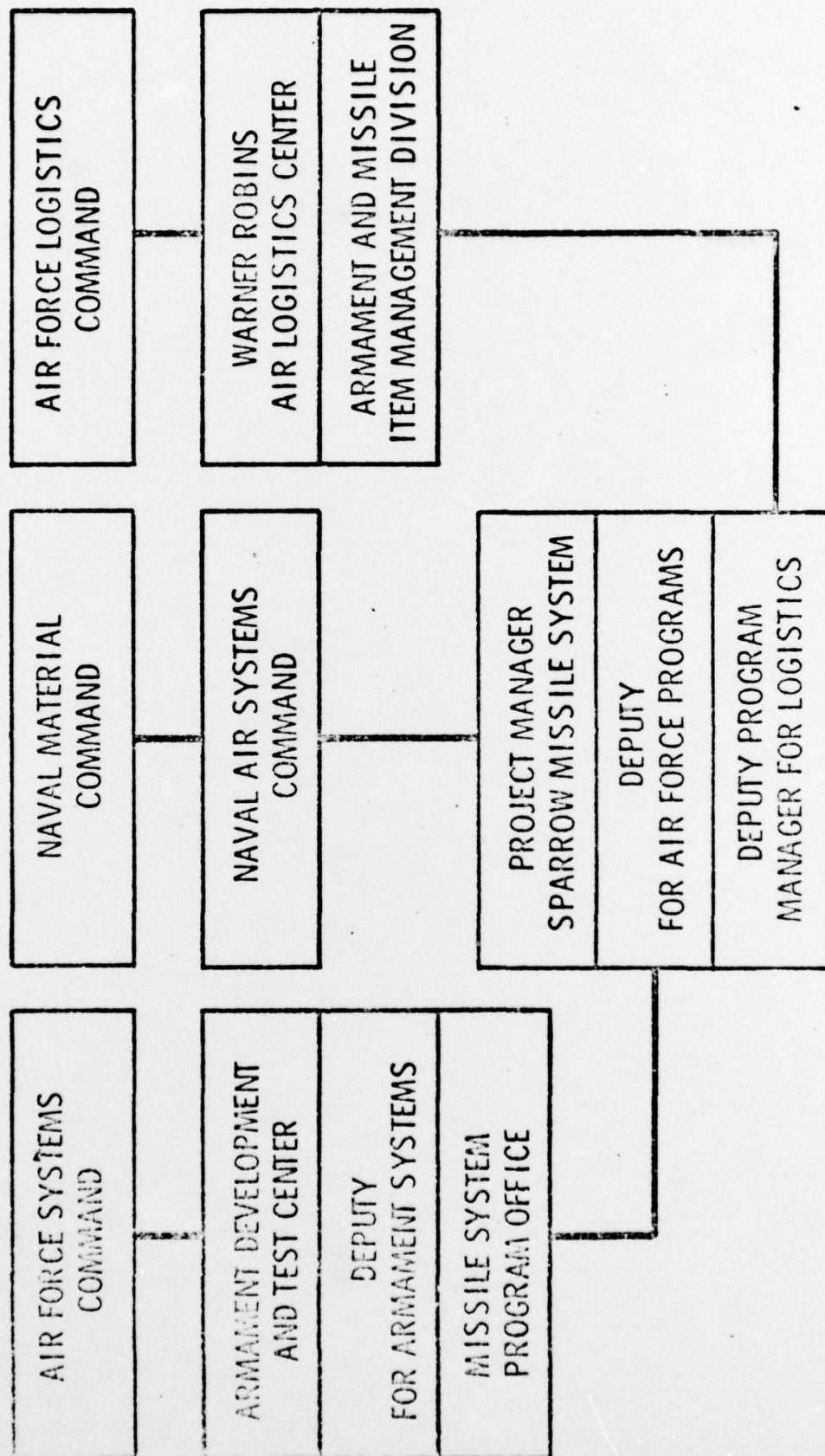
Validates and manages contractor data acquisition.

Maintains a complete file of contractor delivered data.

APPENDIX B

Organizational Chart for the AIM-7F SPARROW Program Office

# **AIM-7F PROGRAM ORGANIZATION**



## APPENDIX C

Product Division Criteria. An assessment of the Armament Development and Test Center by the Program Management Assistance Group, December 1975.

# PRODUCT DIVISION CRITERIA

## What is Needed for Systems Acquisition

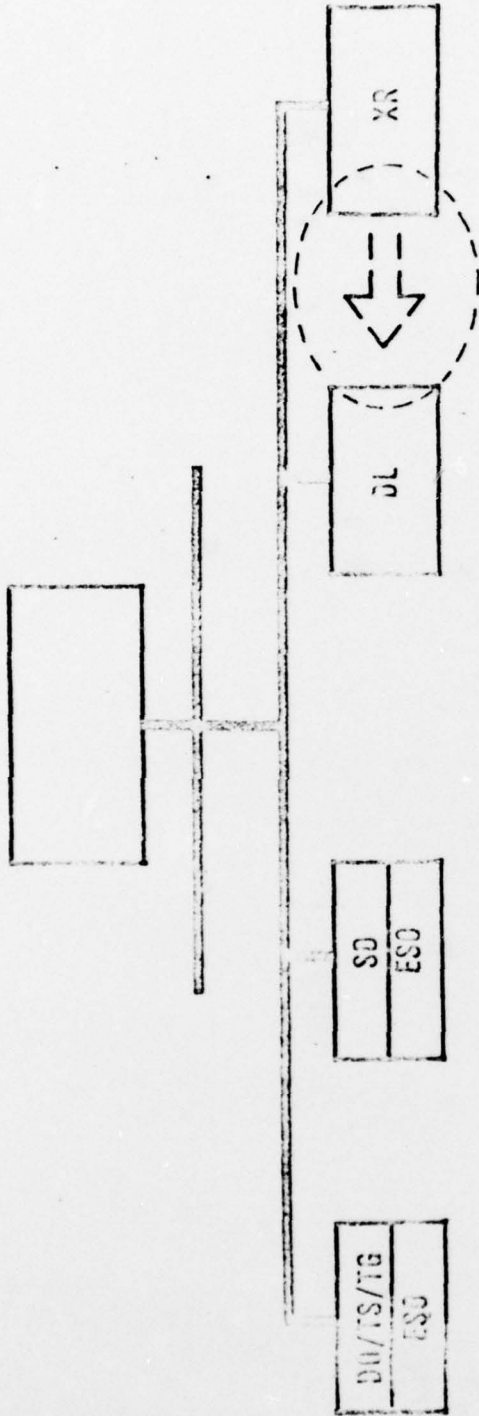
• Development Planning	M	• Staff Business Operations	M
• Technology Base	M	• Cost Estimating	A
• Engineering Capability	M	• Procurement Support	M
• Major Engineering Skills	M	• Judge Advocate	M
• Support Engineering Skills	M	• Training	I
• Integration Skills	I	• Specialized Schools	I
• Program Management	M	• OJT	A
• Review Process	M	• Facilities	M
• Business/Procurement	A	• Funding	M
• Business/Cost & Schedule	M	• Critical Mass	M
• Test & Deployment	M		
• Configuration Management	M		
• Logistics Support	I		
• Logistics Planning	M	• Adequate	A
• Support Equipment	M	• Marginal	M
• Technical Publications	M	• Inadequate	I
• Prog. Mgt. Transfer (PMRT)	M		

\*The original vugraph was color-coded green, yellow, and red. The terms 'adequate, marginal, and inadequate' are interpretative.

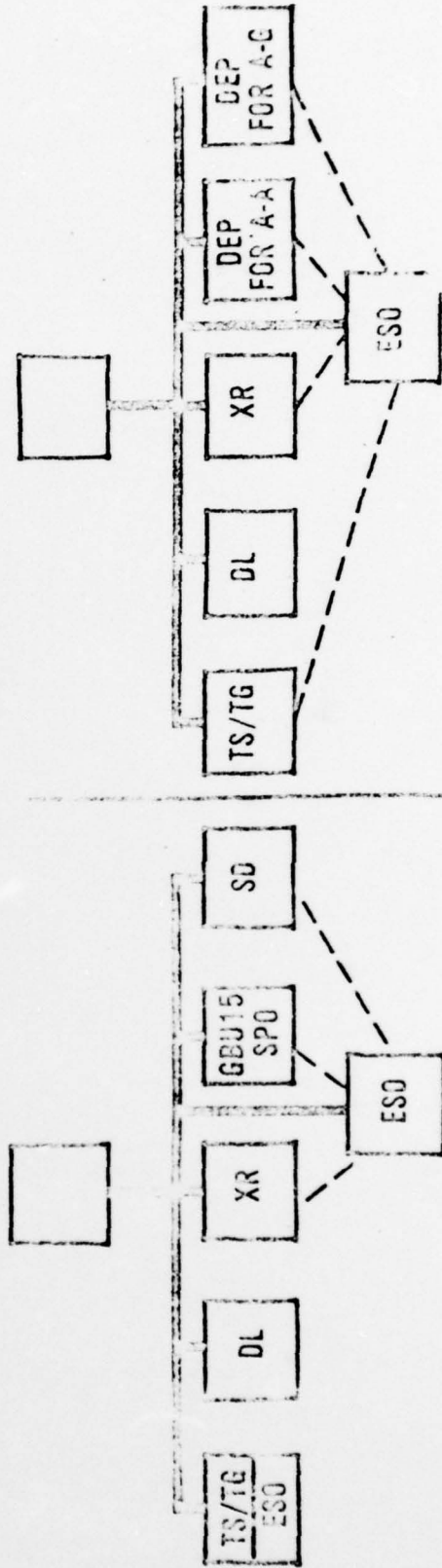
## APPENDIX D

Near-Term and Far-Term Organizational Options for the Armament Development and Test Center. Recommendation by the Program Management Assistance Group, December 1975.

# ORGANIZATIONAL CONSIDERATIONS NEAR TERM



## FAR TERM OPTIONS



## APPENDIX E

A Checklist for Improving the Management of Air Force Air-to-Air Missiles  
Research, Development, Testing and Production Programs.

## APPENDIX E

### A Checklist for Improving the Management of Air Force Air-to-Air Missiles Research, Development, Testing and Production Programs

#### THEME

- \* Commentary/Primary Action//Corollary Actions

#### PREPARATION REQUIRED

- \* Air Force needs to accept as fact and prepare for the inevitability of more joint Service AAM programs/HQ USAF//HQ AFSC and Product Division (Center)
- \* Air Force Laboratories need to reorient from systems development to maintenance of the technology base/Air Force Laboratories//Product Division (Center) and HQ AFSC
- \* Air Force needs to improve the system acquisition capability and image/Product Division (Center) and HQ AFSC//HQ USAF

#### PARTICIPATION REQUIRED

- \* Capable, knowledgeable and industrious staff officers are needed as focal points/HQ USAF and HQ AFSC
- \* Program and project people need to be attracted to and trained in AAM systems acquisition/Product Division (Center) and HQ AFSC
- \* Program managers whose backgrounds include joint Service, multinational, and operational experiences need to be attracted to and trained in AAM systems acquisition/HQ AFSC and Product Division (Center)

#### ORGANIZATION REQUIRED

- \* Air Force Armament Development and Test Center should move to a Product Division/HQ AFSC and Product Division (Center)

- \* The number of Air Force program elements supporting AAM tasks should be reduced to a minimum; one 6.3A line for paper studies and subsystems technology, one 6.3B for systems prototyping and only as many 6.4 lines as needed for approved full-scale development efforts/HQ USAF//HQ AFSC
- \* The aforerecommended reduction in Air Force program elements supporting AAM tasks should be reflective of a single focal point concept in Air Force AAM matters at all levels. HQ USAF/RD, HQ AFSC/SD, and ADTC/SD should provide for those single points of staff activities/All.
- \* The Missile Systems Program Office already established at ADTC should be the directed action office for all Air Force AAM RDT&E tasks.  
Exception: This office should perform liaison-only function for major programs as defined by DODD 5000.1 where minimum layering applies./  
Product Division (Center)//HQ AFSC

#### BIBLIOGRAPHY

1. Anderson, Jack, "For Defense Contractors: How Sweet It Is," The Washington Post, No. 58, 1 February 1976, F7.
2. Cannon, Lou, "President Urges 'New Realism' on Defense Warfare," The Washington Post, No. 46, 20 January 1976, A1, A12.
3. Clements, William P., Acquisition Advisory Group Report of 30 September 1975 to the Deputy Secretary of Defense: Appraisal of and Action Concerning Recommendations, A Memorandum for the Secretaries of the Military Services, DDR&E, ASD(C), ASD(I&L), ASD(PA&E), and ASD(M&RA), 23 January 1976.
4. Department of Defense Appropriations for FY 1975, Hearings before the Senate Subcommittee on Tactical Air Power of the Committee on Armed Services, 93rd Congress, 2d Session, S. 3000, Washington, GPO, 1974.
5. Department of Defense Appropriations for FY 1976 and July-September Transition Period, Hearings before the Senate Research and Development Subcommittee of the Committee on Armed Services, 94th Congress 1st Session, S. 920, Washington, GPO, 1975.
6. Department of Defense Appropriations for FY 1976 and July-September Transitory Period, Hearings before the Senate Subcommittee on Tactical Air Power of the Committee on Armed Services, 94th Congress, 1st Session, S. 920, Washington, GPO, 1975.
7. Department of Defense Program of Test and Evaluation, FY 1976, FY 1977, and FY 1977, Hearings before the House R&D Subcommittee No. 1 of the Armed Services Committee, 94th Congress, 1st Session, Washington, 26 March 1975.
8. Evans, Rowland and Robert Novak, "The Rumsfeld Influence," The Washington Post, No. 55, 29 January 1976, A19.
9. Free World Tactical Missile Systems, 5th Edition, General Dynamics, Pomona, California, June 1973.
10. Gardner, Judy, "Hill Scrutinizes Weapons Sales," The Washington Post, No. 26, 13 December 1975, A2.
11. Gould, Colonel R. P., Lieutenant Colonel P. W. Engebretson, and Lieutenant Colonel F. C. Steinke, NASC Joint Project Office Organization Within ADTC, A Letter to the ADTC Deputy for Armament Systems, 25 April 1975.
12. Guided Missiles Fundamentals, AFM 52-31, Department of the Air Force, Washington, GPO, 1 July 1972.

13. Introduction to Military Program Management, LMI Task 69-28, Logistics Management Institute, Washington, March 1971.
14. "Israelis to Buy F-15 Jets," The Washington Post, No. 24, 11 December 1975, A2.
15. Morris, L., "Then and Now," The Washington Post, No. 103, 17 March 1976, C2.
16. Parson, Nels A. Jr., Missiles and the Revolution in Warfare, Cambridge, Massachusetts, Harvard University Press, 1962.
17. Program Management Assistance Group Review of System Acquisition Capabilities at ADTC and GBU-15 Modular Glide Bomb Program, a briefing with vugraphs presented to the Commander, Air Force Systems Command, 23 December 1975.
18. Project Management in the DOD--A Brief Survey, LMI Task 69-28A, Logistics Management Institute, Washington, July 1969.
19. R&D Management Methods Used by Federal Agencies, R-1156-HEW, RAND Corporation, January 1974.
20. Report to the Deputy Secretary of Defense by the Acquisition Advisory Committee, Vol I, REPORT, Department of Defense, Washington, 30 September 1975.
21. Report to the President and Secretary of Defense on the Department of Defense, Blue Ribbon Defense Panel, Washington, 1 July 1970.
22. Rich, Spencer, "2 Hill Panels Support Ford Defense Budget," The Washington Post, No. 99, 13 March 1976, A2.
23. Rodgers, J. W., Joint Air Force/Navy Advanced Missile Requirements Study Tactical Working Group Session--17, 18 December 1975, a Memorandum for File, Veda Incorporated, Arlington, Virginia, 19 December 1975.
24. Stokes, Phil, "Members Scold Rumsfeld," Air Force Times, Vol. 36, No. 28, 9 February 1976, 7.
25. Supplemental Statement to Report of Blue Ribbon Defense Panel Submitted to the President and Secretary of Defense on Shifting Balance of Military Power, Blue Ribbon Defense Panel, Washington, 1 July 1970, in Strategy Paper No. 9, "The Military Un-Balance -- Is the U.S. Becoming a Second-Class Power?" National Strategy Information Center, Incorporated, New York, 1971, 1-35.

26. T&E Guidelines for Missile Weapon Systems, Office of the Director of Defense Research and Engineering, Deputy Director (Test and Evaluation), Washington, 2 April 1974.
27. Woolsey, James R., "Igniting the Defense Debate," The Washington Post, No. 46, 20 January 1976, A15.

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